Malnad Gidda Cattle - A Valuable Native Breed of Karnataka

D.N.Das, M.K.Rao and A. Obi Reddy
Southern Campus, NDRI, Bangalore - 560 030

Malnad Gidda is a small, multipurpose breed of cattle reared by the farmers in western ghat region of Karnataka. They play a pivotal role in the socio-economic status of the farmers in this region. A survey was carried out in Shimoga district during 2005 for studying the breed. It was observed that Malnad Gidda cattle are generally maintained under semi range housing system. During the day they are allowed to graze in the forest areas and at night, they are kept inside the shed. The shed is made up of brick or stone wall, floor with stones and roof is generally with tiles. The farmers generally utilize this breed for manure, milk and draft purposes. Bedding material containing paddy straw, dry leaves and twigs mixed up with dung and urine becomes an ideal compost fertilizer for coffee and arecanut plantation. The milk produced by this breed is 0.5 - 2.5 liters per day. The disease resistance capability of this indigenous breed is considered to be very important in the present context of characterization, utilization and improvement of the breed.

Seasonal Variations in Seminal Characteristics of Surti Buffaloe Bulls

V. Chandrashekara Murthy*, Anil Kumar Chauhan**, K.S. Gangadhar and G.J. Renukaprasad***
*Vety. College, KVAFSU, Hebbal, Bangalore – 560 024
**J.V. College, Baraut (Uttar Pradesh)
***SLB&TC, Hessarghatta, Bangalore

The study was undertaken to evaluate the seasonal influence on seminal attributes in Surti buffalo bulls utilizing the 1931 ejaculates of 16 bulls over a period of one year. The year was divided into four seasons namely, Winter (Jan – Feb.), Summer (March – May), South-West Monsoon (June – Sept.) and North – West Monsoon (Oct – Dec.). The season did not influence the volume, mass activity, concentration, initial motility and post thaw motility. However, season had significant influence on the number of doses produced and ejaculation number. The number of doses were highest during winter (11.14 ± 0.37) and lowest in summer (4.531 ± 0.14). The number of straws produced was significantly highest during winter (1180 ± 165.5) and lowest in summer (473.6 ± 38.60). The lowest number of ejaculate and straws produced during summer is attributed to sexual rest of 45 days following routine vaccination for infectious diseases. Further, significant differences were observed between the bulls with respect to volume, mass activity, concentration and number of doses produced, with no differences in seminal characteristics. The results revealed maximum semen could be harvested during winter and North – East Monsoon seasons and uneconomical bulls based on semen characteristics may be recommended for culling.
Incidence of Cattle Mastitis in Eastern India

R.K. Misra, S. Dutta, A. Ghosh and R.N. Roy
Eastern Regional Station, NDRI, Kalyani–741 235, Nadia, West Bengal.

The study aims at evaluating the effects of genetic, environmental and microbial factors on the incidence of cattle mastitis in eastern India, and determining the antibiotic sensitivity of the pathogens responsible for the disease based on antibiogram analysis. The incidence of mastitis at the Institute Cattle Farm in 446 crossbred cows (Karan-Fries, Jersey x Tharparkar and Holstein-Friesian x Jersey x Indigenous breeds) and 160 indigenous breeds of cows (Tharparkar/Red Sindhi) calved during 1992-2001 in six lactations were taken into consideration. It was found that the incidence in crossbred cows (44.8%) was significantly higher (P<0.05) than in indigenous breeds (26.9%) in the herd. The cows with high production record (³ 2000 kg milk) were more vulnerable to mastitis irrespective of the genotype, probably due to high metabolic stress. Parity had a significant effect (P<0.05) on the incidence of mastitis in crossbreds. It was highest in the first lactation (67.3%) and declined in later lactations. Staphylococcus and Streptococcus organisms were mainly responsible for the infection either separately or in combination. The antibiogram analysis revealed that the organisms were sensitive to Cephotaxime and Ciproflaxacin.

Chromosomal Aberrations in Yak Hybrids

D.N.Das*, R. Basumatary** and A.Phukan**
*Southern campus, NDRI, Bangalore - 560 030
**National Research Centre on Yak, Dirang, Arunachal Pradesh

Yak hybrids contribute a major share to the economy in the mid altitudes of Arunachal Pradesh both as milch and pack animals. Chromosomal configuration in livestock plays a pivotal role for carrying out further genetic interventions. In the present investigation, blood samples were collected from 32 F1 (½ hill cattle ½ yak) male hybrids (dzo) and 26 F2 (1/4 hill cattle 3/4 yak) female hybrids (kot) from various yak pockets of Arunachal Pradesh. The standard protocols through peripheral blood lymphocyte culture technique were applied, and about 25 nos. of metaphase plates were analyzed from each animal. Cytogenetic analysis revealed the presence of chromosomal anomalies in terms of centromeric break with a frequency of 1.87 per cent in 800 metaphase plates screened. While in kot, 1.54 per cent chromatid breaks were observed in 780 metaphase plates studied. Presence of chromosomal aberrations at a lower frequency (< 2 per cent) without affecting phenotype of the animal might be considered as the natural events of mitosis in yak hybrids.
Criteria for Culling Surti Buffalo Bulls
V. Chandrashekara Murthy*, Anil Kumar Chauhan**,
K.S. Gangadhar and G.J. Renukaprasad***
*Vety. College, KVAFSU, Hebbal, Bangalore – 560 024
**J.V. College, Baraut (Uttar Pradesh)
***SLB&TC, Hessarghatta, Bangalore

The data of culling 88 Surti Buffalo bulls over a period of 20 years maintained at the State Livestock Breeding and Training Centre, Hessarghatta was utilized in the present study to assess the various reasons for culling. The various reasons of culling were grouped into senility (G1), performance (G2), seminal quality (G3) and disease and deformities (G4). Among the different reasons for culling, senility constituted 35%, followed by performance 30%, seminal quality (28%) and disease and deformities (7%). Although the senility was the main cause observed, it is pertinent to include the performance and seminal quality parameters and be given equal weightage which culling the bulls. Further, senility established 55% in G1, poor libido 60% in G2 and poor freezability 31% in G3 were the major causes for culling within each group in Surti buffalo bulls.

Zinc Status in Feed and Fodder of Arid Zone, Bio Availability and Requirement For Milk Production
G.P. Singh
National Research Centre on Camel, P. B. No, 07, Bikaner - 334 001 (Rajasthan)

Zinc is one of most important trace minerals that plays very significant role in bio chemical reactions. Zinc is required for effective digestion, absorption metabolic utilization of other nutrients and is essential for conversion of â carotine to vitamin- A. Feed and fodders samples were collected from randomly selected villages of Bikaner, Churu, Jaisalmer and Nagour districts of Rajasthan along with fodders available at National Research Centre on Camel, (NRCC) for feeding. Zinc content in feed and fodder and their bio availability were determined. Requirement of zinc for milk production was calculated using equations developed. Average zinc content in feed and fodder of NRCC, Bikaner, Churu, Jaisalmer and Nagour districts were 30.82 (9.7-52.0); 30.81 (12.2-138.5); 43.13(0.8-87.4); 20-64 (10.2-64.80) and 26.77 (7.8-164.0) mg/kg DM, respectively. Zinc content was highest in feed and fodder of Churu and lowest in Jaisalmer. However, 73.7,78.2,35.4,93.6 and 89.7 per cent samples contained less than 40 mg/kg DM. The average bio availability of zinc from feed and fodders of arid zone was 59.76 per cent. The zinc requirement of 550 kg lactating camels with 4 kg milk yield was 33.28 mg/day available zinc. Thus the feed and fodders of arid zone need zinc supplementation. Mineral mixture of arid zone of Rajasthan must contain extra zinc to meet the deficiency of feed and fodders.
Mineral Status of Goats Under Intensive Feeding Conditions

S.B. Nageswara Rao*, Nawab Singh and T.K. Dutta
Central Institute for Research on Goats, Makhdoom - 281 122 (UP)
*National Institute of Animal Nutrition and Physiology, Bangalore - 560 030

For better performance of livestock, minerals are equally essential like protein, energy, water and vitamins. Mineral status of farm animals under intensive feeding conditions will serve as base line values for comparing the values obtained under field conditions. In the present study, blood samples (n=46) and hair samples (n=23) of goats were collected under farm conditions. The goats in the farm were receiving concentrate mixture, green fodder and pulse straw (arhar or gram) as per feeding schedule. Goats above six months age were allowed for grazing for six hours on natural pasture comprising anjan (Cenchrus ciliaris) grass. Blood samples were analyzed for copper, zinc, iron, calcium and magnesium. The hair samples were analyzed for copper, zinc, iron and manganese. On the whole, the concentration of blood minerals in kids is higher than the adults indicating more physiological activity in kids as compared to adults (1.00 ± 0.04 and 0.07±0.05 ppm for copper 7.11±0.34 and 4.87±0.21 ppm for iron, 2.78±0.15 and 2.18±0.14 for zinc: 18.26±0.46 and 17.15±0.76 mg / 100ml for calcium and 8.21±0.61 and 7.48±0.71mg/100ml for magnesium). The concentration of minerals in hair samples was found to be 170.20±16.70 ppm for Zn, 6.69±0.55 ppm for copper, 390.02 ± 29.43 ppm for iron and 53.08 ±1.45 for manganese. Hence, the mineral status values obtained under intensive feeding conditions will serve as base line values for field conditions.

Assessing the Associative Effects of Feed Ingredients in Compound Feed

Thirumalesh, T.*, Krishnamoorthy, U. and Kiran, D.
Dept. LPM, KVAFSU, Veterinary College, Bangalore - 560 024

Rumen fermentation characteristics of feed protein and carbohydrates influence efficiency of microbial protein synthesis. Stimulation of rumen fermentation by presence of some feed ingredients might alter the digestibility of other feed ingredients in a ration. Associative effects occur when digestion of one ingredient is not independent of other feeds and could be detected using in vitro gas production test. In this context, six mixed diets with finger millet straw as a roughage component (70% as is) across all the diets and 8 supplementary concentrate mixtures (CFM) were formulated to be similar in rumen degraded protein and energy content. Evaluation of these compounded feeds for gas production revealed significant associative effects at 8, 10 12, 24, 48 and 72 h of incubation which was 26.4, 30.1, 25.1, 13.6, 5.32 and –4.45%, respectively for 6 mixed diets and resulted in significant (P<0.01) increase in k (Rate of organic matter fermentation) (h⁻¹) by 24.29%. It can be concluded that roughages component present in the mixed diets might have influenced the carbohydrate fermentation that resulted in increased gas production and such studies could be meaningful in feed compounding and diet formulations.
Trace Mineral Status in Feeds and Fodders

K.S.N. Prasad and A. Obi Reddy
Southern Campus, NDRI, Bangalore-30

Urban dairy farmers largely depend on green grasses grown on sewage water irrigation. The study was focussed on sewage and non-sewage dependant dairy farmers to analyse trace mineral status in and around Bangalore. A total of about 200 samples of wheat bran, groundnut cake, concentrate mixture, ragi straw, maize fodder, hybrid napier, para grass, guinea grass and miscellaneous grasses were collected from these areas. The samples were analysed for copper, manganese, zinc and iron on Atomic absorption spectrometry. The results showed that Cu, Mn, Zn & Fe in concentrate feeds were in the range of 16-88, 33-114, 21-86 and 111-343 ppm, respectively, whereas in roughages, the ranges were 17-68, 30-225, 40-97 and 178-621 ppm respectively. The copper, manganese and iron were found to be high values in almost all samples while Zn was deficient in most of the samples. The manganese and iron were high in roughages than in concentrates in most of the areas irrespective of sewage water. The area specific mineral mixtures are suitable for this region, as some trace minerals are excess and others are in deficient in this study area.

Feed Evaluation for Rumen Microbial Protein Synthesis

Kiran, D. and Krishnamoorthy, U.
Dept. of LPM, KVAFSU, Veterinary College, Bangalore - 560 024

The study was conducted to establish rumen fermentation characteristics for the feed ingredients commonly used in the manufacturing of compounded cattle feeds and/or in feeding large ruminants in Bangalore and surrounding districts of Karnataka state. The feed samples selected for the study included 8 protein sources, 9 energy sources, 8 varieties of finger millet straw and 12 varieties of rice straw. The fermentation characteristics were studied by measuring the gas production in vitro and by fitting the cumulative gas production against time of incubation in the exponential model. The D and k for protein sources varied from 28.21 to 59.31 and 0.0858 to 0.1562, for energy sources from 65.39 to 95.34 and 0.0544 to 0.1078, for finger millet straw from 47.17 to 56.58 and 0.0493 to 0.0774 and for rice straw from 46.30 to 55.45 and 0.0260 to 0.0375, respectively. The feed samples were incubated again to determine the cumulative gas production and substrate disappearance at time of half asymptotic gas production (t_{1/2}). The ratio of milligram substrate truly digested to milliliter gas produced at t_{1/2} (Partitioning Factor (PF)) was used as an index of efficiency microbial protein synthesis. The PF, for the respective group of feedstuffs varied from 3.86 to 6.31, 3.28 to 4.53, 2.73 to 3.72 and 2.55 to 3.23.
Evaluation of Mineral – Dependent Enzymes as Biochemical Markers for Assessing Mineral Status in Animals

D.T. Pal, C.S. Prasad and N.K.S. Gowda
National Institute of Animal Nutrition and Physiology, Bangalore- 560 030

The present study is aimed at assessing the effect of dietary levels of copper (Cu) and Zinc (Zn) on plasma mineral concentrations and Cu and Zn-dependent enzyme activities in sheep. Eighteen sheep were assigned into three dietary treatments of six animal each in a completely randomized design and fed a basal diet (maize-soyabean meal-urea) alone (control; group–I ) and same diet supplemented with 650% (group o II) or 100% (group-III) more Cu and Zn over basal levels (control) through CuSO₄ and ZnSO₄ sources for a period of 120 days. Blood samples were collected at monthly interval for estimation of plasma mineral concentrations and copper and zinc-dependent enzymes activities. Plasma Cu and Zn concentrations were significantly (P<0.01) higher with increased supplementation of dietary Cu and Zn levels, whereas the levels of macro minerals (calcium, phosphorus and magnesium) were not affected. Supplementation of Cu and Zn (50% or 100%) more than the basal level increased the activities of Cu-Zn Superoxide Dismutase (SOD) and ceruloplasmin, whereas, alkaline phosphates activity was not affected significantly on dietary supplementation of Zn. It was observed that the dietary Cu and Zn supplementation was positively correlated with plasma Cu and Zn. The linear relationship between plasma Cu and SOD activity and between plasma Zn and SOD activity indicated that the enzyme SOD was positively dose-dependent is sensitive to changes in both dietary Cu and Zn and ceruloplasmin to changes in Cu intake and may be used as an index to evaluate Cu and Zn status in animals.

Effect of Pelleted Feeds with Variable Protein and Energy Level on Intake and Lactation Performance in Barbari Goats

T. K. Dutta, Nawab Singh and P. K. Sahoo
Central Institute for Research on Goats Makhdoom - 281 122 (UP)

An experiment was conducted to observe the effect of by-products based pelleted feeds with different ratios of protein and energy on lactation performance in Barbari goats. Treatment groups were group A (CP 18%, TDN 65% in concentrate mash), group B (CP 18%, TDN 70% in concentrate mash), group C (CP 20%, TDN 65% in concentrate mash) and group D (CP 20%, TDN 70% in concentrate mash). Feed pellets were prepared with 30% above concentrate and 70% Cajanus cajan straw. Above pelleted feeds were offered ad lib to each lactating doe under respective groups for entire experimental period. Available green fodder was given ad lib to each animal. The protein content in pelleted feeds ranged from 10.33 (pellet 1) to 11.59 (pellet 4) per cent. DMI(g)/kg W₀.75 was significantly higher (P<0.01) in high protein fed groups (C, 121.46g and D, 130.61g), Average milk yield ranged from 572.86 (group B) to 697.14 (group C) ml/day/doe. Feed conversion efficiency on milk yield basis varied from 34.85 in group B to 37.38 per cent in group D. Total solid in milk ranged from 11.64 (group D) to 14.16 (group C) per cent. SNF content in milk was higher (P<0.05) in group C. Milk protein, fat and ash contents were not influenced by the variable energy and protein ratio in the diet. It may be concluded that pellet 4 (group D) gave best results in terms of intake, milk production and feed conversion efficiency.
“Ovsynch: A Novel Estrous Synchronization Protocol For Augmentation of Reproduction in Repeat Breeding Buffalo Heifers.”

K.S. Roy* & B.S. Prakash**

* National Institute of Animal Nutrition & Physiology, Bangalore - 560030
**Dept. of Dairy Cattle Physiology, NDRI, Karnal – 132001 (Haryana)

The present research was undertaken to investigate the efficacy of Ovsynch protocol for estrus synchronization with or without anti-prolactin (Norprolac) treatment in repeat breeding Murrah buffalo heifers following TAI (Timed artificial insemination) during summer months, through intensive endocrine analysis. For the first time a sensitive enzyme immunoassay (EIA) was standardized and biologically validated for prolactin estimation in buffalo blood plasma. The Norprolac dose was standardized and a dose of 10.0 mg / animal was found to be suitable for prolactin suppression upto 30 hours. The hormones quantified in blood plasma samples collected before, during and after Ovsynch and Ovsynch plus Norprolac treatment were LH, prolactin, progesterone, estradiol–17b and total estrogens. All the animals subjected to Ovsynch treatment (with or without Norprolac) were inseminated at fixed time at 12 h and 24 h post second GnRH injection. Mean plasma prolactin concentrations during cyclicity in buffalo heifers were 40 to 70 times higher in summer months (248.50 ± 16.03 to 369.63 ± 25.13 ng/ml). Plasma prolactin and progesterone concentrations were negatively correlated (r = -0.24) during estrous cycle. In Ovsynch (without prolactin inhibition) treatment 45% of animal and in Ovsynch plus Norprolac treatment, 55% of animal became pregnant during subsequent insemination. It is concluded that Ovsynch protocol for estrus synchronization could have potential application for improvement of fertility in repeat breeding buffaloes even during extreme summer months in combination with suppression of prolactin secretion.

Exon 8 Polymorphism of DGAT 1 Gene in Bovines

Srinivasa Raghavan, V; S.L.Goswami, S.De, T.K.Datta, Manish Kumar, Riti Singh, and Satyapal Yadav
Animal Biotechnology Center, NDRI, Karnal – 132 001  (Haryana)

The study attempted to identify polymorphism in exon 8 of DGAT 1 gene in indigenous cattle (Sahiwal), crossbred cattle (Karan Fries) and Murrah breed of buffalo. The genomic DNA was extracted from blood samples collected from 50 adult lactating animals of each breed using high salt method. The polymerase chain reaction was conducted to amplify a 381 bp size product using appropriately designed primers and was confirmed on agarose gel. The amplified product was subjected to single strand confirmation polymorphism (SSCP) analysis on a poly-acrylamide gel. All the animals of Sahiwal breed were found to be monomorphic. In case of Karan Fries and Murrah breed, 3 different SSCP patterns were observed. Thus based on gel band pattern, the respective PCR products were sequenced to identify single base changes. Sahiwal and Murrah breeds were found to be monomorphic (AA) at positions 10433 and 10434 of exon 8, where as taurine breeds contain GC at the same position. In case of Karan Fries and Murrah breed, 3 different SSCP patterns were observed. Thus based on gel band pattern, the respective PCR products were sequenced to identify single base changes. Sahiwal and Murrah breeds were found to be monomorphic (AA) at positions 10433 and 10434 of exon 8, where as taurine breeds contain GC at the same position. In case of Karan Fries, two types of sequence variations were found and 56% of animals were of heterozygous type (GC / AA) and 44 % of animals were of homozygous type (14 % animals with AA / AA and 30% of animals with GC / GC). The polymorphism in exon 8 causes a change in amino acid make up at position 232 of mature protein from lysine (AA) to alanine (GC). Even though exon 8 of Karan Fries showed two sequence variations, still they were statistically non-significant with respect to 305 days fat yield and average monthly fat yield warranting study in large population.
Goat milk has significant human nutrition. The present study was initiated in Indian goats to characterize them both at protein and genomic level and to study the milk proteomics for further commercial application. The $\alpha_s$-casein A allele was observed in the majority of goats and their frequency in Jamunapari, Barbari, Marwari, Sirohi, Jakhrana, Beetal and non-descript goat from U.P and M.P was 0.71, 0.77, 0.56, 0.76, 0.67, 0.72, 0.45, 0.58 and 0.52, respectively. In $\alpha_s$-casein locus, the A variant had highest frequency in all the breeds, however Marwari, Ganjam and non-descript goats from U.P and M.P had moderate gene frequency of 0.564, 0.450, 0.586 and 0.525, respectively. Barbari had highest and Ganjam goats had lowest $\alpha_s$-Cn$^c$ gene frequency. DNA samples of Indian goats were analyzed for the presence of different $\alpha_s$-casein allele. AA genotype had highest frequency in Indian goats. The molecular analysis at DNA level revealed mainly A, B, C, D, E and F allele at CSN1S1 locus. The analysis indicated that the Indian goat breeds are carrying A allele in higher frequency except Ganjam and local goats indicating the availability of high amount of protein in milk of Indian goats.

Buffaloes are important dairy animals in India. However one of the constraints in exploiting the full potential is their inherent reproductive problems. Assisted reproductive technologies can be adopted to overcome the problems. Efforts are being made to utilize preantral follicles in the ovaries for embryo resource generation. Present study attempted to investigate the effect of individual and group culture on in vitro development of large preantral follicles in buffaloes. Large preantral follicles of 150 to 500 mm size isolated by micro-dissection method from slaughter house derived ovaries were placed individually or in groups in minimum essential medium (MEM) with supplements and cultured in a CO$_2$ incubator for 80 days. There was no significant difference (P>0.05) in the size of follicles between the two groups. However, the preantral follicles in-group culture showed a significantly higher (P<0.05) growth, growth rate and survivability compared to those individually cultured. In conclusion, culturing of preantral follicles in groups was beneficial for their development during in vitro condition.
Feed Resources Availability in Different Regions of India and its Impact on Milk Production

S. Anandan, U.B. Angadi and K.S. Ramachandra
National Institute of Animal Nutrition and Physiology, Bangalore – 560 030

A study was undertaken for estimating the feed resources availability and its relation to the milk production in the north, south, east and western regions of India. The northern region had highest feed resources (156 million tons) followed by western (153 million tons), southern (95 million tons) and eastern regions (75 million tons). The pattern of feed resources availability was reflected in the total milk production of the four regions and the corresponding milk production were 31, 29, 16 and 8 million tones respectively. The huge difference in the milk production (100%) observed between the southern and the eastern region was not commensurate with the differences in the feed resources availability (26%) and the population of the milch animals (14%) between the regions implying that apart from the quantitative availability the quality of the feed resources and the composition of the milch animals affect the milk production. This is evident from the differences in the composition of milch animals, crossbred which are efficient milk producers constituted 26% of the milch animals in southern region while it constituted only 10% in the eastern region.
The relationship of body condition score (BCS) at calving and changes in body weight during eight weeks postpartum and reproductive events was evaluated by milk progesterone concentration in 36 cows. The number of cows in group G1 (BCS of $2.55 \pm 0.06$), G2 (BCS of $3.13 \pm 0.05$) and G3 (BCS of $3.65 \pm 0.065$) was 11, 12 and 13 respectively. The body weight change differed at eight weeks of postpartum among cows in G1 and G3 suggesting that cows having low body condition at calving tend to lose more body weight. The milk progesterone assay indicated luteal activity at 11 days in four cows, 9 days in seven cows in G1, 13 days in six cows and 9 days in six cows in G2 and 14 days in four cows and 9 days in nine cows in G3. Four, three and three cows in G1, G2 and G3 exhibited normal luteal phase of 12 to 17 days. Seven, five and ten cows in G1, G2 and G3 exhibited short luteal phase of 6 to 11 days during the first ovarian cycle. Two, three and three cows in G1, G2 and G3 exhibited shortened luteal phase. Six, five and seven cows and short luteal phase and two, four and three were anoestrous in cows of G1, G2 and G3, respectively. The present study revealed that cows with low BCS and high BCS are vulnerable for postpartum ovarian disturbances. The delay in the initiation of normal postpartum cyclicity is associated with body weight and BCS in cows at calving. This can be modified by optimizing the energy deficiency with better feeding management in early postpartum period.